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UNIVERSITY OF ALBERTA

ACADEMIC SELF-CONCEPT AND READING ABILITY OF DEAF ADOLESCENTS

BY

BABETTE ANN JESSEN

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH IN

PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF EDUCATION

IN

SPECIAL EDUCATION -- HEARING IMPAIRED

DEPARTMENT OF EDUCATIONAL PSYCHOLOGY

EDMONTON, ALBERTA

FALL 1991

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled ACADEMIC SELF-CONCEPT AND READING ABILITY OF DEAF ADOLESCENTS submitted by BABETTE ANN JESSEN in partial fulfillment of the requirements for the degree of MASTER OF EDUCATION in SPECIAL EDUCATION -- HEARING IMPAIRED.

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Date : 7 June, 1991

DEDICATION

This thesis is dedicated to my children,

Alastair and Alana

ABSTRACT

The present study was designed to compare the academic self-concept of deaf adolescents enrolled in two different educational settings and to explore the relationship between academic self-concept and reading achievment of the deaf adolescents in each setting. One group of adolescents received 50% or more instructional time with other deaf students (Group I) whereas the other group received 50% or more instructional time with hearing students (Group II). A total of 28 subjects, thirteen in Group I and fifteen in Group II, was obtained from thirteen educational institutions located in a western Canadian province.

Three instruments were administered including (a) the Self-Concept of Ability Scale--Form D used to assess academic self-concept, (b) the Canadian Achievement Tests--Reading Comprehension subtest to assess reading ability, and (c) the Raven's Standard Progressive Matrices to assess non-verbal ability. Results of an analysis of variance indicated no significant difference in academic self-concept between the two groups of students. Similarly, a Pearson product moment correlation indicated that the relationship between academic self-concept and reading ability was non-significant for both groups. However, further analyses determined that Group II students scored significantly higher in both reading ability and non-verbal ability than Group I students. The groups did not significantly differ in hearing loss or age. When the 28 adolescents were divided by gender, analyses of academic self-concept, reading ability, non-verbal ability, hearing loss, and age indicated no significant differences between male and female students.

Findings suggest that although deaf adolescents receiving the majority of instructional time with hearing students have higher reading and non-verbal abilities than deaf adolescents receiving the majority of instructional time with other deaf students, there is no significant difference in academic self-concept levels between the groups.

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CHAPTER ONE
INTRODUCTION

The present research was undertaken to compare the academic self-concept of two groups of deaf adolescents who were enrolled in educational institutions in a western Canadian province and to explore the relationship between academic self-concept and reading achievement within each group. The students in the first group received the majority of their instructional time with other deaf students whereas the students in the second group received the majority of their instructional time with hearing students. The background and rationale for the study, objectives of the study, terminology, and an overview are presented in this chapter.

Background and Rationale for the Study

Academic and social integration of deaf and hard of hearing children with hearing children has been a goal of educators of hearing impaired students since the early 1800s (Bender, 1981; McLaughlin, 1980; Moores, 1982; Rodda, Grove & Finch, 1986). Most early attempts at integration were unsuccessful (Moores, 1982; Rodda & Grove, 1987). However, since the passage of Public Law 94-142: The Education of All Handicapped Children Acts, 1975, in the United States, mandating a free appropriate public education (FAPE) for all handicapped children including those who have hearing losses, there has been renewed interest in integration. Consequently, an increasing number of hearing impaired students have been integrated into regular classrooms to receive academic instruction with hearing students (Allen & Osborn, 1984). If the current mainstreaming trend is to meet with success, research is needed to study the school achievement of integrated students and to identify variables related to students' academic performance (Pflaster, 1980).

During the 1970s and early 1980s, much of the research on the effectiveness of integration focussed on the social adjustment of deaf and hard of hearing students or on the social acceptance of the students by hearing peers or teachers (Anitia, 1982; Kennedy & Bruninks, 1974; Ladd, Munson, & Miller, 1984) rather than on academic performance of integrated students. Researchers examining academic performance each focussed on a single aspect of integration including (a) hearing loss (Jensema, 1975; Owrid, 1970; Reich, Hambleton, & Houldin, 1977), (b) linguistic abilities (McConnell & Liff, 1975), and (c) reading ability (Doehring, Bonnycastle, & Ling, 1978; Reich et al., 1977).

Results of one of the first studies providing a comprehensive view of variables related to academic performance of integrated students indicated that the three factors of major importance in reading achievement were oral communication skills, personality, and linguistic competence (Pflaster, 1980). Emergence of the second factor, personality, "revealed that personality traits are also important to academic performance" (Pflaster, 1980, p. 77) and that educators "should begin to delimit their focus from such matters as level of auditory response and early intervention to include less tangible matters, such as personality" (pp. 77-78), which includes self-concept.

Comparative studies of students in integrated and segregated settings have indicated that integrated students are academically more successful than those segregated in self-contained classrooms (Allen & Osborn, 1984; Kluwin & Moores, 1985; Zwiebil & Allen, 1988). Although integrated students have displayed different demographic and handicapping characteristics than non-integrated students (Allen & Osborn, 1984; Jensema, 1975; Karchmer, Milone, & Wolk, 1979; Karchmer & Trybus, 1981), most researchers agreed that even when such variables were controlled, integrated students had higher achievement levels than non-integrated counterparts (Allen & Osborne, 1984; Kluwin & Moores, 1985; van der Horst, 1971; Zwiebel &

Allen, 1988). Such results have led to the suggestion that factors other than age, sex, race, hearing loss, and additional handicap status may have contributed to differences in achievement levels (Allen & Osborne, 1984; Pflaster, 1980).

Educational researchers in the hearing population have suggested that one factor which might influence academic performance of students is academic self-concept. Results of studies comparing academic self-concept and academic ability, including reading ability, consistently indicated a positive correlation between the variables (Brookover, Thomas, & Paterson, 1964; Burke, Ellison, & Hunt, 1985; Marsh, Smith, & Barnes, 1985). Likewise, one study designed to examine the relationship between academic self-concept and academic ability of deaf students enrolled at two schools for the deaf found a positive correlation between these two variables (Joiner, Erickson, Crittenden, & Stevensen, 1969). Although academic self-concept has been a focus of educational research in the hearing student population, the relationship between academic self-concept and academic achievement in deaf students, particularly integrated deaf students, has received limited attention.

In conclusion, since an increasing number of deaf and hard of hearing students are being mainstreamed, it is important to examine the academic achievement of deaf students being educated in both hearing and deaf settings and to identify variables related to their academic performance. In the hearing population, researchers have explored and reported a positive relationship between the variables of academic self-concept and academic achievement. Few researchers have conducted such studies with deaf individuals, a population for whom reading is an important medium for instruction, learning, and interaction with hearing society (Rodda & Grove, 1987; White & Stevenson, 1975).

Parents and educators need to be more aware of the variables affecting academic achievement and this study generates further information to meet this need. Thus, the rationale for this study was to investigate and contribute information on the relationships that might exist between deaf adolescents' academic self-concept and reading achievement.

Objectives

The study had two specific objectives. The first objective was to compare the academic self-concept of two groups of deaf adolescents. One group of adolescents received the majority of instructional time in a hearing setting, whereas the other group received the majority of instructional time in a deaf setting. The second objective was to explore the relationship between academic self-concept and reading achievement of deaf adolescents in both the hearing and deaf settings. In addition, the variables of reading ability, non-verbal ability as assessed by the Raven's Standard Progressive Matrices, degree of hearing loss, age, and gender were examined.

Terminology

Following are definitions of terminology used in this study.

Hearing Impairment

Hearing impairment is a generic term covering the entire range of auditory impairment from mild losses (25 dB) to profound losses (90 dB and greater). The term can be used to describe those individuals who are either hard of hearing or deaf. Since members of both the hard of hearing and deaf consumer groups have recently voiced distaste for the term "hearing impaired", use of the term is avoided as much as possible.

Deaf / Deafness

The Conference of Executives of American Schools for the Deaf defines a *deaf* person as "one whose hearing is disabled to an extent (usually 70 dB ISO or greater) that precludes the understanding of speech through the ear alone, with or without the use of a hearing aid" (Moores, 1982, p. 6). In this study the terms "deaf" and "deafness" refer to a hearing threshold level greater than 70 dB in the better ear. The average threshold equals the mean of the pure tone thresholds obtained at 500 Hertz, 1000 Hertz, and 2000 Hertz.

Prelingual Deafness

Prelingual deafness refers to a hearing disability present at birth or prior to the acquisition of speech and language, usually before two years of age.

Postlingual Deafness

Postlingual deafness refers to a hearing disability occurring after the spontaneous acquistion of speech and language. Postlingual deafness may be referred to as *adventitious* deafness.

Academic Self-Concept

Academic self-concept or *self-concept of ability* refers to the evaluations students make of themselves regarding their ability to achieve in academic tasks as compared to others (Brookover, Erickson, & Joiner, 1967).

Educational Settings

Educational settings are usually classified as *integrated* or *segregated* depending upon the degree to which deaf students are integrated into classes with hearing students (Brill, 1974; Kampfe, 1984; Reich, Hambleton, & Houldin, 1977). Integrated settings are those that place deaf students in classes with hearing students. In this study the terms *integration* and *mainstreaming* are used interchangeably. Education of deaf students in a segregated setting refers to the

practice of educating deaf students in classes with other deaf students rather than with hearing students. The term "segregated" is used infrequently in this study because it does not adequately describe those settings where deaf students are educated with other deaf students.

Reading Ability / Reading Level

Reading ability or *reading level*, in this study, refers to that skill measured by the Reading Comprehension subtest of the Canadian Achievement Tests.

Total Communication

"The term *total communication* came into popular use during the 1970s" (Moores, 1982, p. 9). Individuals receive input through amplification, signs, fingerspelling, and speechreading and express themselves through speech, fingerspelling, and signs. As a system of communication it is based on each student's individual needs.

Sign Language

The term *sign language* refers to the communication system used by students attending the school for the deaf mentioned in this study. This communication system relies mainly on the use of signs supplemented with fingerspelling. There is limited use of amplification, speechreading, and speech.

Overview

An introduction to the problem including general background information and rationale, objectives, and terminology has been provided in this chapter.

A review of the literature beginning with a discussion of mainstreaming is included in Chapter II. The review focuses on global self-concept, academic self-concept, and deaf students' reading abilities. The variables of intelligence, hearing

loss, and age level are also briefly discussed. The chapter concludes with a statement of the hypotheses.

Chapter III provides an overview of the methodology used to conduct the study including information pertaining to subjects, assessment instruments, data collection, and data analysis.

In Chapter IV the analysis and results of data are presented. Conclusions, limitations, and implications of the study and suggestions for futher research are discussed in Chapter V.

CHAPTER TWO

REVIEW OF THE LITERATURE

Introduction

Although the literature is replete with studies examining global self-concept and deafness (Garrison, Tesch, & DeCaro, 1978; Schein, 1980; Warren & Hasenstab, 1986), few researchers have focussed on academic self-concept or on the relationship between academic self-concept and academic achievement in the deaf student population (Joiner et al., 1969). In view of the fact that the practice of mainstreaming deaf students into academic settings with hearing students has increased over the past two decades, it is important to identify variables related to the academic performance of mainstreamed students. In the hearing population, researchers have determined that the variable of academic self-concept consistently correlates with academic achievement, including reading achievement (Brookover et al., 1964; Burke et al., 1985; Marsh et al., 1985). It is possible that a similar correlation exists in the deaf student population and research in this area could contribute to the academic success of deaf students.

The literature review begins with a discussion of mainstreaming including a definition, an historical summary of integration practices in deaf education, current mainstreaming practices and trends, and the academic achievement of mainstreamed students. Secondly, the review focuses on three areas including self-concept and self-concept in the deaf population, academic self-concept and its relationship to academic achievement, and deaf students' reading abilities. Thirdly, a brief discussion of the variables of intelligence, hearing loss, and age follows. To conclude the literature review, three hypotheses stemming from the review are proposed.

Mainstreaming

> Mainstreaming refers to the temporal, instructional, and social integration of eligible exceptional children with normal peers. It is based on an ongoing individually determined educational needs assessment, requiring clarification of responsibility for coordinated planning and programming by regular and special education administrative instructional and support personnel (Kaufman, Gottleib, Agard, & Kuric, 1975, pp. 40-41).

The term "mainstreaming" has come into common usage over the past two decades but the practice of mainstreaming or integration in the field of deaf education is not a new concept.

Historical Review

"Social integration into the larger community has long been considered one of the goals of education" (Sherin, 1985, p. 279). During the nineteenth century, in central and northern Europe, the Soviet Union, and the United States, several attempts were made to integrate deaf students into classes with hearing students. In 1821, Johann Baptiste Graeser, a Bavarian educator, established one of the first experimental schools for deaf students within a regular school in Bayreuth, Bavaria. Deaf students were gradually integrated into regular classes. Although the concept of integration was initially accepted and became a part of the public school system in many German states, the experiment eventually met with failure and was abandoned. The integrated students were unable to make the same academic progress as their hearing classmates and parents and school authorities felt that having deaf children in hearing classes was detrimental to the academic progress of the hearing students (Bender, 1981; Giangreaco & Giangreco, 1970; Moores, 1982). As with Graeser's

experiment, most similar attempts at integration met with failure, were abandoned, and were replaced with segregated educational facilities (McLaughlin, 1980; Moores, 1982).

In Canada, one of the first experiments in integration involved placing deaf students in classrooms with hearing students in an industrial training school. Whether or not the program was successful is unknown because the school, the Fredericton Institution for the Education of the Deaf and Dumb in New Brunswick, was closed in June 1902 and never reopened (Rodda, Ellis, & Chaddock, 1983; Rodda et al, 1986).

Current Mainstreaming Practices and Trends

Since World War II there has been a steady increase in the number of deaf students being integrated to some extent into educational settings with hearing students (Moores, 1982). This increase has been more prevalent in the United States since the United States Congress passed Public Law 94-142: The Education of All Handicapped Children Act in November 1975. In Canada, similar legislation, such as Bill 82 in the Province of Ontario, has emphasized free appropriate public education (FAPE) in the least restrictive environment be made available for handicapped children. Such legislation is sometimes viewed as a recommendation for mainstreaming but mainstreaming may not be the least restrictive environment commensurate with a particular child's needs (Bersoff & Voltman, 1979; Brill, 1978).

Moores (1982) suggested that since 1974 "probably more deaf children in all settings are being exposed more to hearing students than ever before" (p. 17). Each year, the April issue of the American Annals of the Deaf lists Canadian schools for the deaf and classes for students with hearing losses. Although information regarding enrollments in the various settings is incomplete, enrollment data for each of the major provincial schools for the deaf has been presented annually. Comparison of

enrollment data, over the past 15 years, for four schools for the deaf located in each of the four western provinces (British Columbia, Alberta, Saskatchewan, and Manitoba) indicated a decline in the enrollment in each school. Such a decline may suggest that deaf students are being educated in alternate school settings. Enrollment data for autumn 1974 (Craig & Craig, 1975), autumn 1979 (Craig & Craig, 1980), autumn 1984 (Craig & Craig, 1985), and autumn 1989 (Craig & Craig, 1990) is presented in Table 1.

Table 1

Enrollment Data for Four Western Canadian Schools for the Deaf

	Autumn of			
School / Province	1974	1979	1984	1989
Jericho Hill British Columbia	202	155	127	106
ASD* Alberta	162	175	119	90
Saskatchewan	157	115	105	90
Manitoba	116	115	126	90

*ASD--Alberta School for the Deaf

MacDougall (1987) provided information, as of August 1985, on the number of deaf children, aged birth to 21 years, in each province in Canada. Data for the four western Canadian provinces included (a) British Columbia--1006 deaf children, 82.6%

aged 5 through 18 years; (b) Alberta--824 deaf children, 77.2% aged 5 through 18 years; (c) Saskatchewan--408 deaf children, 70.6% aged 5 through 18 years; and (d) Manitoba--540 deaf children, 72.2% aged 5 through 18 years. Ages 5 through 18 are considered legal school age. Comparison of the number of deaf children in each province in 1985 with the total enrollment in each provincial school for the deaf during the school terms 1984-85 and 1989-90 indicated that few of the deaf children were being educated in schools for the deaf.

In summary, data compiled by Craig and Craig (1975, 1980, 1985, 1990) and MacDougall (1987) indicate a trend towards the practice of mainstreaming deaf students with hearing students. This trend has led to studies being conducted into the academic achievement of mainstreamed students.

Academic Achievement of Mainstreamed Students

Researchers have explored the academic achievement of mainstreamed hearing impaired students but information they provide is limited. Results of studies have indicated that mainstreamed students are academically more successful than those students receiving instruction in self-contained classrooms (Allen & Osborn, 1984; Jensema, 1975; Kluwin & Moores, 1985; van der Horst, 1971; Zwiebil & Allen, 1988). However, when compared with segregated counterparts, mainstreamed students displayed different demographic characteristics, such as higher academic ability, including reading ability (Allen & Osborne, 1984; Jensema, 1975; Karchmer & Trybus, 1981; Pflaster, 1980), less severe and later onset of hearing loss (Allen & Osborne, 1984; Karchmer & Trybus, 1981, Karchmer et al., 1979), classification as having higher family income (Allen & Osborne, 1984; Jensema, 1975; Karchmer et al, 1979), and fewer additional handicapping characteristics (Allen & Osborn, 1984).

In view of the differences between the two deaf student populations, researchers examined the degree to which integrated and non-integrated students

differed in achievement when the effects due to differences in demographic characteristics were statistically controlled. Allen and Osborne (1984), in their study of 423 integrated and 817 non-integrated subjects, found that the integrated students performed better on mathematics and reading achievement tests when students from each group were matched on specific characteristics, such as age, sex, ethnic status, hearing loss, age of hearing loss, and additional handicapping conditions. Kluwin and Moores (1985) reported similar results. In their study of 36 integrated and 44 non-integrated adolescents, when the variables of prior achievement, sex, ethnicity, and degree of hearing loss were controlled, the integrated adolescents performed significantly better in mathematics achievement than their non-integrated counterparts. The researchers concluded that factors other than age, sex, race, hearing loss, and additional handicap status may have contributed to differences in achievement levels.

As previously indicated, Pflaster (1980) reported that the three major factors related to a hearing impaired student's academic performance in the regular classroom are oral communication, personality characteristics, and linguistic competence. The personality factor included such traits as achievement motivation, attitudes toward learning, overall personality, determination, effort, social maturity, and self-image.

Personality traits such as those suggested by Pflaster have received limited attention in studies of mainstreamed students' academic achievement. However, in a study of 80 randomly selected deaf students attending two schools for the deaf, Joiner et al. (1969) examined the relevance of self-concept of ability and intelligence in the grade point average of the deaf students. The researchers used the Self-Concept of Ability--Form D (SCA-D), a measure designed for deaf students, to measure academic self-concept and the Weschler Intelligence Scale for Children (WISC) to measure intelligence. Grade point average represented grades received in academic

subjects at least three months after collection of the self-concept of ability scores. The researchers found a higher correlation between self-concept of academic ability and grade point average than between intelligence and grade point average. They concluded that increased attention to deaf students' self-perceptions of academic ability might improve academic achievement.

Since academic self-concept is but one facet of self-concept, the following section will provide an examination of the multifaceted construct of global self-concept.

Self-Concept

Self-concept, also referred to as total or global self-concept, can be defined as the "perceptions one has of oneself in terms of personal attributes and the various roles which are played or fulfilled by the individual" (Beane & Lipka, 1980, p.2). Developed through interaction with significant others, self-concept is both the cause of particular behaviours and the effect of particular experiences (Guterman, 1982; Rosenberg, 1979).

Multifaceted Nature of Self-Concept

Self-concept has been described as a multidimensional construct having one general or global facet and several specific facets (Brookover et al.,1964; Byrne, 1984; Shavelson & Bolus, 1982). As individuals develop from infancy to adulthood self-concept becomes increasingly multifaceted (Shavelson & Bolus, 1982). Shavelson, Hubner, and Stanton (1976) proposed a multifaceted model of self-concept with general self-concept at the apex and perceptions of behaviour in specific situations at the base. General self-concept is first divided into academic self-concept and non-academic self-concept. Academic self-concept is divided into specific subject areas, such as English or Mathematics. Each academic subject or sub-area is further divided

into evaluations of behaviour, such as grades on tests in each specific subject area. Non-academic self-concept is divided into the social, emotional, and physical facets. These sub-areas of non-academic self-concept are followed by evaluations or perceptions of behaviour in specific situations.

The model is also hierarchical in that general self-concept correlates highest with academic self-concept, next highest with specific subject self-concepts, such as English, and lowest with grades or evaluations. As well, specific subject self-concept correlates higher with grades in that subject than with grades in other subjects (Shavelson & Bolus, 1982).

Development of Self-Concept

The self is not initially present at birth but arises in the process of social experience. It develops, in an individual, as a result of his or her relations to the social system as a whole and to other individuals within the social system (Mead, 1934).

In early childhood, parental attitudes and behaviours help young children form images about who and what they are (Shaffer, 1989; Warren & Hasenstab, 1986). When children enter school, the number of significant others in their lives expands to include teachers and peers and at this time children begin to form ideas about their individual strengths and weaknesses. During adolescence, individuals begin to place more emphasis on the opinions of their peer group (Beane & Lipka, 1986) and self-concept begins to include not only personal attributes but also beliefs, values, and attitudes (Shaffer,1989).

In summary, development of self-concept is influenced by four factors including individuals' (a) evaluations of themselves based on attitudes others hold towards them, (b) evaluations of themselves based on attributes important to them, (c) evaluations of their attributes in relation to attributes of peers, and (d) evaluations

based on their own actions and outcomes of actions (Guterman, 1982; Rosenberg, 1979).

Deafness and Self-Concept

Although there is general agreement that a hearing loss "seems to exercise a significant effect on social and personality development" (Rodda, Denmark, & Grove, 1987, p. 5), results of studies examining global self-concept in the deaf population are inconsistent and inconclusive. Some researchers have reported that deaf students rated themselves lower than hearing students on self-concept measures (Garrison et al., 1978; Loeb & Sarigiani, 1986, Meadow, 1976; Schein, 1980) whereas others have contended that deaf students rated themselves the same (Cole & Shade, 1985) or higher than hearing students (Craig, 1965). Disparity of findings could have resulted from (a) the variety of measures used (Garrison et al., 1978; Yachnik, 1986), (b) the different deaf populations studied (Garrison & Tesch, 1978), and (c) the influence of extraneous variables, including demographic variables, variables relating directly to the hearing impairment, parental child-rearing attitudes, and parental hearing status (Loeb & Sarigiani, 1986; Meadow, 1969; Warren & Hasenstab, 1986; Yachnik, 1986).

Development of Self-Concept in Deaf Children

Deaf children may experience difficulty developing positive self-concept because problems with language and communication produce barriers to normal interaction with family and society (Loeb & Sarigiani, 1986; Warren & Hasenstab, 1986). During infancy, deafness and communication deficits interfere with the social-interactive process between deaf infants and their hearing mothers. Such interference impedes development of the mother-child bond and hampers infants' development of positive feelings of self (Altshuler, 1974). Beyond infancy, deaf children's low levels of communication continue to affect hearing parents "who may become discouraged when their communicative efforts are not reciprocated by the child" (Loeb & Sarigiani,

1986, p. 89). The resulting decrease in communication and interaction with hearing family members can lead to deaf children experiencing isolation within their family home (Vernon, 1974).

One group of deaf children who are able to communicate and interact with family members are those children who have deaf parents. Such deaf children have been found to display higher self-concept than deaf children of hearing parents (Meadow, 1968, 1969; Yachnik, 1986).

Outside the family home, deaf students who are unable to read or write English cannot communicate with hearing individuals or participate in mainstream society (Rodda & Grove, 1987). Limited interaction with and negative feedback from significant others, such as teachers and peers, can lead to feelings of isolation (Bosch, 1976) and can have a negative impact on self-concept.

Self-Concept and Academic Achievement

Researchers exploring the relationship between self-concept and academic achievement in the hearing population, have reported either a positive correlation between the two variables (Caplin, 1969; Lamy, 1965; Mitchell, 1979; Wattenberg & Clifford, 1964) or no significant correlation between global self-concept and academic achievement, but significance between the academic facet of self-concept and academic achievement (Brookover et al., 1964; Burke et al.,1985; Marsh et al.,1985).

In the deaf student population, Garrison et al. (1978) found that deaf adolescents who scored higher on a test of reading comprehension also scored higher on a self-concept measure. However, the researchers concluded that the low self-concept scores were caused by the students' inability to read adequately and understand questions rather than by poor self-concept (Garrison et al., 1978).

Given the multifaceted nature of self-concept and difficulties involved in measuring the construct, few of the many studies examining the relationship between

self-concept and academic or reading achievement can be replicated or compared. As a result, educational researchers have tended to discard self-concept as a relevant variable in understanding school behaviour and have focussed on the academic facet of self-concept (Joiner & Erickson, 1969). As a research variable, academic self-concept is more easily defined and measured.

Academic Self-Concept

The academic facet of self-concept, called self-concept of ability or academic self-concept, is applied to the school learning situation and to the student role. It refers to "the evaluations one makes of oneself in respect to his ability to achieve in academic tasks as compared to others" (Brookover et al., 1967, p. 2) and "performance in terms of school achievement is the relevant behavior influenced" (Brookover et al., 1964, p. 271). An individual "acquires conceptions of his ability to learn various types of behavior through interaction with others whose evaluations are important to him" (Brookover & Erickson, 1969, p. 16). Thus, academic self-concept refers to a student's perceptions of his or her academic ability. Such perceptions are influenced by significant others, such as teachers, peers, and parents, and are believed to influence academic achievement.

Academic Self-Concept and Academic Achievement

Several researchers have examined the relationship between academic self-concept and academic achievment in the hearing population (Brookover et al., 1962, 1964, 1965, 1967; Burke et al., 1985; Marsh et al., 1985; Shavelson & Bolus, 1982). Results of an extensive study spanning six years and tracking students from seventh grade through twelfth grade indicated that self-concept of ability, as measured by the Self-Concept of Ability scale, was significantly and positively related to achievement among both boys and girls (Brookover et al., 1962, 1964, 1965, 1967). Furthermore,

the relationship persisted when the variable of intelligence was controlled.

Similar results were reported by Burke et al.(1985). Using the Self-Concept of Ability scale designed by Brookover et al. (1962), the researchers found a significant correlation between the academic self-concept and the reading achievement of 187 eighth grade students. Likewise, Marsh et al. (1985) and Shavelson and Bolus (1982), in examinations of reading achievement and academic self-concept, cited positive relationships between the two variables.

Within the deaf student population, few researchers have examined the relationship between academic self-concept and academic achievement, particularly reading achievement. As previously mentioned, Joiner et al.(1969), using 80 randomly selected deaf students enrolled in two schools for the deaf, reported a higher positive correlation between academic self-concept and grade point average than between intelligence and grade point average. In their study, the researchers did not focus specifically on reading achievement.

Reading

Deaf students may experience reading difficulties because of inadequate language development (Truax, 1978). Thus, the task of learning to read becomes one of language learning (Quigley & Kretschmer, 1982). Results of one study indicated that the growth in reading achievement of a hearing impaired student over five years was approximately one-third that of a hearing student (Wolk & Allen, 1984). Deaf students have been found to have lower reading levels than hearing students of similar chronological and mental age (Conrad, 1979). For example, twenty year old deaf individuals had a grade 4.5 reading level (Furth, 1966).

Although reading levels for deaf students are low, studies have shown that reading is the optimal receptive medium (above oral, manual, and total

communication) for purposes of instruction and interaction between the deaf child and hearing society (Rodda & Grove, 1987; White & Stevenson, 1975). Reading provides a link between the deaf person and hearing society but reported low reading levels would indicate that few deaf individuals establish such a link.

As previously mentioned, delayed language development may have a detrimental effect on the reading achievement of deaf students. Similarly, the variables of intelligence, hearing loss, and age may influence the reading ability and / or the academic self-concept of deaf students.

Other Variables

For both hearing and hearing impaired students, an intelligence test is often included in an educational assessment to obtain an estimate of each student's cogitive functioning and thus provide an indication of learning potential (Salvia & Ysseldyke, 1985; Sattler, 1982). For deaf children, the most appropriate intelligence measure is one which is non-verbal in content (Sattler, 1982). A verbal measure or an intelligence measure having a verbal scale would be measuring only language deficiencies (Sullivan, 1982). One non-verbal measure of ability which has previously been used with deaf students is the Raven's Standard Progressive Matrices (Raven, Court, & Raven, 1983; Wood, Wood, Griffiths, & Howarth, 1986).

Degree of hearing loss may have an impact on deaf children's academic achievement. Conrad (1979), in a study of 468 deaf and partially hearing adolescents, found that degree of hearing loss correlated with achievement in reading, lip-reading, speech, and language.

Age may be a factor in students' perceptions of their academic abilities. Nicholls (1978) reported that, in the hearing population, older students perceived their reading attainment more accurately than younger children. Older students with

histories of high academic performance generally attributed their performance to high ability. Failure would not be expected and, if it did occur, was attributed to bad luck or lack of effort. Older students having histories of poor performance attributed any successes to good luck or high effort and attributed failure to low ability. However, younger children overestimated their attainment and continued to have higher expectancies after failure. Nicholls (1978) suggested that after eleven years of age the concepts of effort and ability were differentiated from each other.

Summary

Information on several areas related to deafness was presented in the literature review. In addition, important implications for research in the area of deafness and academic achievement were raised. Deaf students who are currently mainstreamed with hearing students for educational purposes tend to have higher academic achievement than deaf students who are not mainstreamed. Although several variables have been studied to determine their effect on the academic achievement of deaf students, researchers in the deaf population have rarely explored the relationship between academic self-concept and academic achievement, particularly reading achievement. In view of the importance of reading in a deaf person's interaction with hearing society, it is necessary to determine factors related to reading ability.

In the present research, information regarding the relationship between the academic self-concept and reading achievement of deaf students is provided. Specifically, a comparison is made between the academic self-concept levels of deaf adolescents in two different educational settings, those receiving 50% or more instructional time with hearing students and those receiving 50% or more instructional time with other deaf students. In addition, the relationship between academic self-

concept and reading ability of deaf adolescents in each of the two educational settings is explored.

Hypotheses Derived From the Literature Review

Hypothesis I

Deaf adolescents receiving 50% or more instructional time with other deaf students will have significantly higher academic self-concept than deaf adolescents receiving 50% or more instructional time with hearing students.

Hypothesis II

There will be a significant relationship between academic self-concept and reading ability in deaf adolescents receiving 50% or more instructional time with other deaf students.

Hypothesis III

There will be a significant relationship between academic self-concept and reading ability in deaf adolescents receiving 50% or more instructional time with hearing students.

CHAPTER THREE
METHODOLOGY

Information pertaining to the subjects, instruments, data collection, and data analysis is presented in this chapter.

Subjects

A total of 28 deaf adolescents was obtained from the deaf student population enrolled in thirteen educational institutions located in a western Canadian province. The thirteen institutions consisted of eleven urban and rural junior and senior high schools, one urban school for the deaf, and one urban college providing senior high school upgrading.

Subject Criteria

Subjects were required to meet three criteria including (a) a hearing threshold level greater than 70 dB unaided in the better ear, (b) freedom from gross additional difficulties having capacity to impair learning, and (c) a reading comprehension grade score of 2.5 or higher on the latest administration of the Reading Comprehension subtest of the Canadian Achievement Tests.

Subject Grouping

Subjects were divided into two groups determined by their educational settings. Group I consisted of those students who, in the educational setting, received 50% or more instructional time with deaf students and Group II consisted of those students who, in the educational setting, received 50% or more instructional time with hearing students. Out of school settings or interactions were not considered.

Initially, Group I consisted of 13 students and Group II consisted of 22 students making a total of 35 subjects. However, seven students in Group II were excluded from the study because (a) two students had hearing losses less than 70 dB in the better ear, (b) two students did not meet the minimum grade 2.5 reading requirement, and (c) three students were attending post secondary educational institutions (university or technical college). Although the three post secondary students met requirements regarding hearing loss, reading ability, and absence of learning difficulties, they were excluded because no post secondary students were obtained for Group I. Thus, 28 subjects were included in the study with thirteen subjects in Group I and fifteen subjects in Group II. Individual characteristics of adolescents in Group I and in Group II are summarized in Table 2 and Table 3 respectively.

Of the thirteen subjects in Group I, two students were upgrading senior high school courses at a college, one attended an urban public junior high school, and ten students attended a school for the deaf with five enrolled at the junior level and five at the senior level. Sign language served as a primary means of communication and instruction for eleven students, one student was oral, and one required total communication. All of the adolescents in Group I were prelingually deafened.

Of the fifteen students in Group II, one student was upgrading senior high school courses at a college, ten attended public senior high schools, and four attended public junior high schools. Twelve subjects were oral and three required total communication for instructional purposes. One student in Group II was deafened at approximately three years of age. All other adolescents were prelingually deafened. Group comparisons of subject characteristics pertaining to gender, age, and hearing loss are provided in Table 4.

Table 2

Individual Characteristics of Group I Adolescents

Subject	Gender	Age	BEA*	Communication
1	F	22-2	103	Sign
2	M	18-5	87	TC**
3	M	14-2	73	Oral
4	M	13-6	80	Sign
5	F	15-3	98	Sign
6	M	14-3	95	Sign
7	M	16-5	105	Sign
8	M	15-9	102	Sign
9	M	15-8	102	Sign
10	M	16-9	108	Sign
11	M	17-3	90	Sign
12	M	19-11	110	Sign
13	M	18-1	95	Sign

*BEA = Better Ear Average--average hearing threshold for 500, 1000, and 2000 Hz.

**TC = Total communication

Table 3

Individual Characteristics of Group II Adolescents

Subject	Gender	Age	BEA*	Communication
1	F	21-6	88	TC**
2	M	17-0	110	Oral
3	F	17-3	93	TC
4	F	16-3	105	TC
5	F	15-9	95	Oral
6	M	15-4	80	Oral
7	M	19-2	80	Oral
8	M	16-3	75	Oral
9	F	19-6	95	Oral
10	F	17-10	80	Oral
11	M	15-7	75	Oral
12	M	13-6	95	Oral
13	F	15-4	85	Oral
14	M	15-11	85	Oral
15	F	17-8	95	Oral

*BEA = Better Ear Average--average hearing threshold for 500, 1000, and 2000 Hertz.

**TC = Total communication

Table 4

Comparison of Characteristics by Group

Characteristics / Means	Group I	Group II
Number of subjects	13	15
Male	11	6
Female	2	9
Age Range	13-6 to 22-2	13-6 to 21-6
Mean age	16.74	16.92
HL* Range (dB)	73 - 110	80 - 110
Mean HL (dB)	96	89.07

*HL = Hearing loss

Instruments

The test measures used for this study were the (a) Self-Concept of Ability Scale--Form D (SCA-D), (b) Canadian Achievement Tests--Reading Comprehension (CAT), and (c) Raven's Standard Progressive Matrices (SPM).

Self-Concept of Ability Scale--Form D (SCA-D)

Joiner and Erickson's (1967) scale, SCA-D (see Appendix A), is a modification of the Self-Concept of Ability Scale--Form A (Brookover et al., 1962) and was designed for use with deaf students. The self-report form consists of eight items intended to measure deaf students' perceptions of academic ability. Each item consists of a question to be answered by three response alternatives. For this study,

response alternatives were rated on a three-point scale with (a) answer "a" = 3, (b) answer "b" = 2, and (c) answer "c" = 1. Total scores could range between 8 and 24 points.

Since the SCA-D was designed for use in the United States, a modification was made to the vocabulary of the scale. The word "college" was replaced with "university".

The Spache Readability Formula (Smith, 1980) and the Fog Index (Muir, 1978) were used to determine the reading level required to understand the Self-Concept of Ability Scale--Form D (SCA--D). Readability formulae are used to "produce a number or number range which approximates the achievement level required of a reader in order to comprehend a written passage" (Muir, 1978, p. 285). Minimum reading level required for the SCA-D was determined to be between grade levels 1.6 and 1.9 (see Appendix B).

Joiner and Erickson (1967) conducted studies of the SCA-D to determine reliability and validity of the measure. Test-retest correlations were obtained to determine reliability. Comparison of responses of two groups of hearing impaired students (N = 190) to the SCA-D over one week produced correlations of .54 and .88. In addition, the relationship between total scores and item scores was used to test internal reliability. Correlations of .448 and .560 were obtained.

Correlations between the SCA-D and perceived evaluations of parents, teachers, and friends ranged between .48 and .71, were significant ($p < .05$), and supported construct validity of the instrument. To determine predictive validity, correlations between the SCA-D and grade point average were used. Significant correlations ($p < .05$) were obtained for each of the two groups of hearing impaired adolescents (.51 and .32). Although low, correlations between the SCA-D and grade

point average were slightly higher than those between intellegence and grade point average (.42 and .24).

Based on the results of the study conducted by Joiner and Erickson (1967) there is indication "that reasonably comparable and reliable data" (p. 64) can be obtained from the modified version of the Self-Concept of Ability Scale.

The Canadian Achievement Tests (CAT)--Reading Comprehension

The Canadian Achievement Tests provide both norm referenced and criterion referenced assessment. Standardization, conducted in 1981, was based on data obtained from 76,000 subjects chosen from school districts reflecting three separate Canadian regions and urban-rural differences. Validity was established during the process of item selection and test development. Item selection was based on four aspects of the item including (a) discrimination in difficulty among the grades at each level, (b) discrimination of difficulty among five achievement groups based on students' total scores for the test, (c) degree of consistency with the entire test, and (d) the influence on reliability. Reliabilty was based on the Kuder-Richardson formula 20. Correlations between raw score data for each test level and achievement group and the Kuder-Richardson formula are provided in tables in the Technical Bulletin (Canadian Achievement Tests).

The California Achievement Tests provided the initial pool of items for the CAT but many items were revised or deleted for appropriateness for the Canadian curricula and additional items written by Canadian teachers were added. The CAT consists of eight levels, levels 12 through 19, suitable for assessing students from primary through senior high school. The appropriate test level for each student is determined by administering a CAT locator test or by considering scores obtained on previous administration of the CAT.

The Reading Comprehension subtest of the CAT can be administered in a group setting. The subtest consists of 40 items based on several reading selections and measures skills in literal, interpretive, and critical comprehension. For this study scores on the subtest were converted to grade equivalent scores.

Raven's Standard Progressive Matrices Test (SPM)

Although the Standard series of Raven's Progressive Matrices cannot be considered a test of "general intelligence", this instrument was designed to assess an individual's general range of non-verbal ability (Raven et al., 1983). The SPM has previously been found useful in assessing deaf students' non-verbal intelligence (Wood et al., 1986). Reliability studies on the SPM indicated internal consistency (split-half measures) correlations of .90 with a modal value of .91 and test-retest correlations of .83 to .93. Concurrent validity was based on correlations with other non-verbal and performance tests. Correlations with the Binet and Wechsler Scales ranged between .54 and .86 (Raven et al.,1983).

The SPM consists of five sets (A to E) of twelve problems designed to assess an individual's intellectual activity in five successive lines of thinking (Raven et al., 1983). Each set commences with a problem having a self-evident solution and becomes progressively more difficult with successive problems. Individuals are allowed to work through the scale at their own speed. On completion of the SPM individuals are classified by grades determined by the scores they obtained. For this study grades were rated on an eight-point scale as shown in Table 5.

Table 5

Converted Raven's Grades

Percentile	Grade	Converted Score
95 and over	I	8
90 and over	II+	7
75 and over	II	6
50 and over	III+	5
49 and less	III-	4
25 and less	IV	3
10 and less	IV-	2
5 and less	V	1

Data Collection

Prior to conducting this study, permission was obtained from school board and school administrators, parent(s) or guardian(s) of students (see Appendix C), and students selected for inclusion in the study (see Appendix D). Once permission was received, a Subject Data Form (see Appendix E) was completed using information from the subject's cumulative record card. Anonymity was assured by giving each subject an identification number and placing the identification number rather than the subject's name on the Subject Data Form.

The total time required for administration of tests varied from 45 to 90 minutes. Testing was conducted during one or two sessions depending upon the time and number of class periods the students had available and was conducted by the

researcher in a quiet room in the subjects' home schools. Eighteen of the 28 subjects were tested in group settings of two or more students and ten of the subjects, each of whom was the only deaf student in a particular school, were tested individually. When assessments were conducted with students whose primary mode of communication was either sign language or total communication, a teacher or interpreter fluent in that communication system was present to provide instructions and interpret questions and answers. Prior to administration of each test, efforts were made to establish a relaxed and friendly atmosphere. All tests were scored by the researcher.

The CAT--Reading Comprehension subtest was the first test administered. The test level administered to each student was determined by the score the student had received on a recently administered standardized reading test. If no score was available, a CAT reading locator test was administered. Prior to administration of the CAT, instructions were given in the primary communication mode used by the students, a practice item was provided, and students were encouraged to ask questions. Although students were allowed to ask questions during the test, questions pertaining to test items such as difficulties with concepts or vocabulary were not answered. Depending upon the level of test administered, test time was 31 to 35 minutes.

The SCA-D was the second assessment administered. Instructions were provided in the primary communication mode of the students and students were encouraged to ask questions prior to and during testing if they did not understand concepts or vocabulary. No time limit was set but administration took approximately five to ten minutes.

The SPM was the third test administered. Again, instructions were given, practice items were provided, and students were encouraged to ask questions prior to

and during testing. No time limit was set for the SPM and subjects required anywhere from 15 to 45 minutes to complete the test.

Data Analysis

The StatView II computer program, designed for the Macintosh computer, was used to analyse the data for the study. An analysis of variance was used to determine whether a difference existed between the academic self-concept scores of deaf adolescents receiving 50% or more instructional time with other deaf students and deaf adolescents receiving 50% or more instructional time with hearing students. A Pearson product-moment correlation coefficient was used to compute the correlation coefficient between academic self-concept and reading ability for each group of deaf adolescents. An analysis of variance was also used to determine differences between the groups for each of the variables of reading ability, non-verbal ability, hearing loss, age, and gender. The following chapter will provide results of data analysis.

CHAPTER FOUR

RESULTS

In this chapter, statistical analyses of the data are presented and interpreted in three main sections corresponding with the three hypotheses presented in Chapter II. The chapter concludes with a subsidiary analysis section providing results regarding the variables of reading ability, non-verbal ability, hearing loss, age and gender.

Hypothesis I

Deaf adolescents receiving 50% or more instructional time with other deaf students (Group I) will have significantly higher academic self-concept than deaf adolescents receiving 50% or more instructional time with hearing students (Group II).

Results

Scores for academic self-concept were based on raw scores obtained from the SCA-D. Scores ranged from 13 to 23 out of a possible range of 8 to 24. Ranges, means, and standard deviations for group results on the SCA-D are shown in Table 6.

Table 6

Ranges, Means, and Standard Deviations (SD) of Self-Concept of Ability Scores

Group	N	Range*	Mean	SD
I	13	13 - 22	17.15	2.609
II	15	13 - 23	18.20	2.597

*Raw scores out of a possible range of 8 to 24.

An analysis of variance was used to determine whether there was a significant difference between the two groups for self-concept of ability. Results are provided in Table 7.

Table 7

Analysis of Variance of Self-Concept of Ability (SCA-D)

Source	D.F	Sum of Squares	Mean Squares	F Ratio	F Prob
Between groups	1	7.622	7.622	1.125	.2985
Within groups	26	176.092	6.733		
Total	27	183.714			

Conclusions

Although the mean score on the SCA-D was higher for Group II than for Group I, an analysis of variance indicated that no significant difference existed between the two groups. Hypothesis I was rejected. Deaf adolescents receiving 50% of more instructional time with other deaf students did not have significantly higher academic self-concept than deaf students receiving 50% or more instructional time with hearing students.

Hypothesis II

There will be a significant relationship between academic self-concept and reading ability in deaf adolescents receiving 50% or more instructional time with other deaf students (Group I).

Results and Conclusions

A Pearson product-moment correlation coefficient was used to analyse the relationship between academic self-concept and reading ability of deaf adolescents in Group I. Although a low positive correlation was found between these two variables, the correlation was not significant, ($R = .146$, $F = .553$, $df = 11$, $p < .05$). Hypothesis II was rejected. There was no significant correlation between academic self-concept and reading ability in deaf adolescents receiving 50% or more instructional time with other deaf adolescents.

Hypothesis III

There will be a significant relationship between academic self-concept and reading ability in deaf adolescents receiving 50% or more instructional time with hearing students (Group II).

Results and Conclusions

A Pearson product-moment correlation coefficient was used to analyse the relationship between academic self-concept and reading ability of deaf adolescents in Group II. Although a low positive correlation was found between the two variables, the correlation was not significant, ($R = .255$, $F = .514$, $df = 13$, $p < .05$). Hypothesis III was rejected. There was no significant correlation between the academic self-concept and reading ability of deaf adolescents receiving 50% or more instructional time with hearing students.

Other Variables

Reading Ability

Reading scores were based on grade equivalent scores obtained from the CAT--Reading Comprehension subtest. For the total sample, scores ranged from grade 2.5 to the ceiling score of 12.9 obtained by two students. Ranges, means, and standard deviations for group scores are provided in Table 8.

Table 8

Ranges, Means, and Standard Deviations (SD) of Reading Ability Scores

Group	N	Range*	Mean	SD
I	13	2.5 - 10.6	4.477	2.281
II	15	3.5 - 12.9	7.807	3.717

* Grade equivalent scores

An analysis of variance was conducted to compare the reading scores for the two groups. Results are provided in Table 9.

Table 9

Analysis of Variance of Reading Ability Scores by Group

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob
Between group	1	77.214	77.214	7.847	.0095
Within group	26	255.852	9.84		
Total	27	333.067			

Comparison of group reading scores, as reported in Table 8, indicated that Group II had a higher mean reading score, wider range of scores, and larger standard deviation of scores than Group I. The analysis of variance indicated a significant difference in reading ability between Group I and Group II. Deaf students receiving 50% or more instructional time with hearing students had a significantly higher reading ability than deaf students receiving 50% or more instructional time with other deaf students.

Non-Verbal Ablility

Non-verbal ability scores were converted scores based on scores obtained from the SPM (Table 5, Chapter III). Converted scores ranged from 3 to 8 out of a possible range of 1 to 8, with 1 as the lowest and 8 as the highest score. Ranges, means, and standard deviations of non-verbal ability scores are presented in Table 10.

Table 10

Ranges, Means, and Standard Deviations (SD) of Non-Verbal Ability Scores

Group	N	Range*	Mean	SD
I	13	3 - 6	4.615	1.044
II	15	3 - 8	5.867	1.457

* Converted scores based on SPM Grade scores

An analysis of variance was conducted to determine whether a significant difference existed between the non-verbal ability scores of Group I and Group II. Results are shown in Table 11.

Table 11

Analysis of Variance for Non-Verbal Ability

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob
Between groups	1	10.904	10.904	6.622	.0161
Within groups	26	42.81	1.647		
Total	27	53.714			

Comparison of non-verbal ability scores, shown in Table 10, indicated that Group II had a wider range of scores, a higher mean score, and a larger standard deviation of scores for non-verbal ability than Group I. Results of an analysis of variance (Table 11) confirmed a significant difference between the two groups. Deaf students who received the majority of instructional time with hearing students had higher non-verbal ability than deaf students who received the majority of instructional time with other deaf students.

Hearing Loss

All subjects in this study had a hearing loss in excess of 70 dB in the better ear based on a pure tone average of 500, 1000, and 2000 Hertz. Hearing losses ranged from 73 dB to 110 dB. Ranges, means, and standard deviations of hearing losses for each group are shown in Table 12.

Table 12

Ranges, Means, and Standard Deviations (SD) of Hearing Loss

Group	N	Range*	Mean*	SD
I	13	73 - 110	96.00	10.992
II	15	75 - 110	89.067	10.437

* dB

An analysis of variance was conducted to determine whether a significant difference existed between hearing losses of Group I and Group II. Results are shown in Table 13.

Table 13

Analysis of Variance for Hearing Loss

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob
Between groups	1	334.781	334.781	2.926	.0991
Within groups	26	2974.933	114.421		
Total	27	3309.714			

The range, mean, and standard deviation of hearing losses for Group I were greater than those for Group II (Table 12). However, results of an analysis of variance shown in Table 13 indicated no significant difference existed in hearing losses of the two groups of deaf adolescents.

Age

Adolescents in this study ranged in age from 13 years 6 months to 22 years 2 months. Ranges, means, and standard deviations of ages for each group are shown in Table 14.

Table 14

Ranges, Means, and Standard Deviations of Age

Group	N	Range*	Mean**	SD
I	13	13-6 to 22-2	200.85	29.433
II	15	13-6 to 21-6	203.07	23.995

* Age in years and months

** Age in months

To determine a possible significant difference between the ages for Group I and Group II, an analysis of variance was conducted. Results are indicated in Table 15.

Table 15

Analysis of Variance for Age

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob
Between groups	1	34.339	34.339	.048	.8276
Within groups	26	18456.626	709.87		
Total	27	18490.964			

Information provided in Table 14 suggested that the age range and standard deviation were larger for Group I. Although the mean age was higher for Group II, an analysis of variance (Table 15) showed no significant difference in age between the two groups of deaf adolescents.

Gender

Of the 28 deaf adolescents who participated in this study, 17 were males and 11 were females. Group I had 11 males and 2 females. Group II had 6 males and 9 females. Although the variable of gender was not discussed in the literature review, in view of the disproportionate number of males to females between the groups and within each group, particularly Group I, analyses were conducted to determine if differences existed between males and females for the variables of academic self-concept, reading ability, non-verbal ability, hearing loss, and age. An analysis of variance conducted for each variable showed no significant difference between groups, male and female, for academic self-concept (p = .7571), reading ability (p = .5889), non-verbal ability (p = .9696), hearing loss (p = .2736), and age (p = .0664).

CHAPTER FIVE

DISCUSSION

The present study was designed to compare the academic self-concept of deaf adolescents enrolled in two different educational settings and to examine the relationship between academic self-concept and reading ability of the adolescents in each setting. This chapter begins with a discussion of the results for each hypothesis and for the variables of reading ability, non-verbal ability, hearing loss, age, and gender. Secondly, limitations and implications of the study are discussed. To conclude the chapter, suggestions are provided for further research.

Summary of Results and Discussion

Hypothesis I

Hypothesis I was developed to compare the academic self-concept of deaf adolescents who were being educated in two different educational settings. Results of the analysis found no significant difference in academic self-concept between the two groups of deaf adolescents. Although the difference was not statistically significant, the academic self-concept of the deaf students receiving the majority of instructional time with hearing students appeared to be higher than that of deaf students receiving the majority of instructional time with other deaf students.

Researchers have not compared the academic self-concept of deaf students in different educational settings but those examining global self-concept have suggested that levels of self-concept within the deaf student population "vary directly with the extent of institutional living" (Garrison & Tesch, 1978, p. 459). In a study of 48 nine to twelve year old children, Craig (1965) found that deaf residential students rated themselves significantly higher on self-concept measures than either deaf day school

students or hearing public school students. In turn, the deaf day school students rated themselves higher than the public school students.

Results for academic self-concept obtained in the present study supported neither Craig's findings nor the suggestion that "the greater the proportion of individuals in a deaf child's life who are themselves deaf, the higher the self child's self-esteem will tend to be" (Guterman, 1982, p. 120). However, the present study did not examine students' associations outside the educational setting or control for differences in living situations. Further, in view of the limited number of subjects in the present study, results should be considered tentative until more research is conducted and results are replicated.

Hypothesis II

Hypothesis II was developed to examine the relationship between academic self-concept and reading ability in deaf adolescents receiving 50% or more instructional time with other deaf students (Group I). A low positive correlation ($\underline{R}$ = .146) was found between academic self-concept and reading ability but the correlation was not significant. The correlation found in the current study was not as high as the correlations between academic self-concept and grade point average ($\underline{R}$ = .51 and .32) found in a previous study of 80 randomly selected deaf adolescents enrolled in two schools for the deaf (Joiner et al., 1969). In the current study and that conducted by Joiner et al. (1969) the same measure of academic self-concept, SCA-D, was used. However, results of the present study must be considered inconclusive until similar studies are conducted with larger numbers of subjects.

Hypothesis III

Hypothesis III was developed to examine the relationship between academic self-concept and reading ability of deaf adolescents receiving 50% or more instructional time with hearing students (Group II). A low positive correlation ($\underline{R}$ = .255) was

found between academic self-concept and reading ability but the correlation was not significant. Although the correlation between the two variables was higher for deaf students receiving the majority of instruction with hearing students (Group II) than for deaf students receiving the majority of instruction with other deaf students (Group I), neither correlation was significant nor as high as the correlations obtained in the Joiner et al. (1969) study. However, as previously mentioned, more definitive results could be obtained with larger numbers of subjects.

Other Variables

The variables of reading ability, non-verbal ability, hearing loss, age, and gender were each subjected to a statistical analysis to determine whether there was significant difference between the two groups of deaf adolescents on any of these variables. Results of analyses indicated a significant difference between the groups on the variables of reading ability and non-verbal ability. The deaf adolescents receiving 50% or more instructional time with hearing students (Group II) had significantly higher reading ability and significantly higher non-verbal ability than those deaf adolescents receiving 50% or more instructional time with other deaf students (Group I).

The analyses further indicated that the variables of degree of hearing loss and gender did not appear to influence either reading ability or academic self-concept. The variable of age served primarily as a control measure to ensure that the mean age of each group was similar.

Another difference observed in the data but not subjected to statistical analysis relates to the primary communication mode of each group. The majority of deaf students in Group II were oral, that is, they used speech as a primary means of communication whereas the majority of deaf students in Group I used sign language as a primary mode of communication.

Reading. Analysis of reading scores on the CAT--Reading Comprehension subtest indicated that the deaf adolescents who received 50% or more instructional time with hearing students (Group II) attained significantly higher reading scores than the deaf adolescents who received 50% or more instructional time with other deaf students (Group I). Such results are similar to those for mathematics achievement reported by Kluwin and Moores (1985) and reading and mathematics achievement reported by Allen and Osborn (1984). In each of the studies, the deaf students integrated with hearing students achieved significantly higher scores than deaf students educated in self-contained classrooms with other deaf students.

Reading levels for the deaf student population tend to be lower than those for the hearing population (Conrad, 1979; Quigley & Kretschmer, 1982). In a study of 468 fifteen- and sixteen-year-old deaf and partially hearing students, Conrad (1979) reported that the adolescents achieved an average reading age of nine years. The mean reading score of grade 4.477 for Group I is similar to the score reported by Conrad. However, the mean reading score of grade 7.807 for Group II is higher than either the score achieved by Group I, in the present study, or that achieved by the adolescents in Conrad's study. Such results indicate that some deaf children, such as those who are integrated, do achieve relatively high reading levels.

In the current study, the role of academic self-concept in reading achievement was investigated. Although the deaf students receiving the majority of instructional time with hearing students had higher reading abilities (Group II), no significant difference in self-concept of abilty was found between Group I and Group II students. As such, it would appear that the academic facet of self-concept does not play a significant role in reading achievement, but because of the small number of students participating in the current investigation, results must be interpreted with caution.

Quigley and Kretschmer (1982) stated that many deaf children, upon school entrance, do not have a foundation in language. It is through print that such deaf children may be first exposed to vocabulary and syntax which are not a part of their linguistic repertoire. Thus, the task of learning to read becomes a language learning experience and as such decreases the speed at which deaf students learn to read. As previously mentioned, growth in reading achievement of hearing impaired children was found to be one-third that of hearing children (Wolk & Allen, 1984).

In the present study, students in Group II may have achieved higher verbal and language abilities prior to learning to read. Information regarding early verbal and language abilities was not obtained but of the fifteen students in Group II, twelve were oral whereas only one student in Group I was oral. As previously mentioned, Pflaster (1980) found that the factor having the strongest relationship with reading achievement of mainstreamed deaf students was oral communication skills. Perhaps the better oral skills of the students in Group II contributed to the task of learning to read and to the higher reading achievement. However, deaf students with limited oral skills can learn to read at or above age level. One of the Group I participants, 13 - 6 years old, who used sign language as a primary means of communication at school and at home, achieved a reading score of grade 10.6 on the CAT. This score was well above the student's age and grade level.

Conrad (1979) found that deaf children with higher reading abilities were more likely to lipread well, speak more intelligibly, and were rated higher on language abilities by teachers. In addition, such deaf children displayed *internal speech* when reading, that is the readers converted the printed symbols or graphemes into speech sounds. Wood et al. (1986) suggested that internal speech or the "capacity to read and memorize words in terms of their sounds, rather than degree of deafness...was what differentiated good and poor deaf readers" (p. 95). Again, in view of their oral

skills, the deaf adolescents in Group II may have used internal speech thus contributing to the higher reading achievement.

In the present study, several factors might have contributed to the higher reading achievement displayed by the deaf adolescents receiving the majority of educational instruction with hearing students. Although academic self-concept was not a factor significantly correlated with reading achievement, such results should not be considered conclusive until replicated by studies including larger numbers of subjects.

Non-verbal ability. Analysis of non-verbal ability scores obtained from the Raven's Standard Progressive Matrices (SPM) indicated a significant difference in scores between Group I and Group II. Deaf adolescents receiving 50% or more instructional time with hearing students (Group II) had significantly higher non-verbal ability than those receiving 50% or more instructional time with other deaf students (Group I). Students in Group II who obtained significantly higher scores in reading comprehension also obtained significantly higher scores in non-verbal ability suggesting a possible positive relationship between the two variables. Such results concur with those reported by Conrad (1979) who found that non-verbal intelligence of partially hearing and deaf adolescents correlated with reading ability, lipreading skills, and speech intelligibility. On the contrary, Wood et al. (1986), in an examination of the linguistic abilities of 50 severely and profoundly deaf children, "found no evidence that intelligence...contributed to success on linguistic measures" (p. 118). Wood et al. further suggested that Conrad's findings were due to the large and heterogeneous composition of the sample. Although results of the present study support results obtained by Conrad (1979), in view of the limited number of deaf students in the present study, results should be viewed as tentative.

Hearing loss, age, and gender. Analysis of each of the variables of hearing loss, age, and gender indicated no significant differences between groups. Therefore, it appeared that these variables did not significantly influence the academic self-concepts or reading abilities of the deaf adolescents included in the current investigation. Similar results were reported by Wood et al. (1986) who found no evidence that degree of hearing loss contributed to the linguistic skills of severely and profoundly deaf children. However, as mentioned previously, because of the limited number of participants in the current investigation, results must not be considered conclusive.

Limitations

There are several limitations of the present study:

1. A small number of deaf students participated in the study. Although 85 students were invited to participate, approximately two-thirds of these students, or their parents on behalf of the students, declined the invitation to be included. Previous overtesting or busy study schedules were cited as reasons for not wishing to participate. As a result, only 28 adolescents participated in the study. In view of the limited number of subjects involved in the study, results obtained should be considered tentative until they are replicated with a larger sample drawn from a more diverse geographic area.

2. The instrument chosen to evaluate self-concept of ability was the Self-Concept of Ability Scale--Form D (SCA-D). The instrument was chosen because it is the only measure of its kind designed to be used with deaf students. However, background information on the SCA-D is limited and descriptions of reliability and validity are confusing. Therefore, results obtained from the measure should not be considered definitive.

3. No attempts were made to examine out of school associations, that is the amount of time spent with other deaf or hearing individuals outside the school setting, or to control for differences in living situations. The results obtained should be interpreted with this limitation in mind.

Implications

Results of the present investigation highlight four implications for the education of deaf students and for the selection of deaf students for mainstream education. Prior to discussing implications of the reseach, it should be noted that the purpose of the study was neither to critique the two educational settings used in this research nor to recommend one setting over another. Some deaf students and their parents prefer or require the services offered by deaf settings such as schools for the deaf whereas other deaf students and parents choose mainstream settings. In view of the different needs of individual deaf students, it is imperative that both types of educational facilities remain an option for deaf students and their parents.

Four implications of the present research follow:

1. Correlations between academic self-concept and reading achievement in this research were found to be low and non-significant but the importance of academic self-concept in academic achievement should not be overlooked. Previous studies in the hearing population (Brookover et al., 1964, Marsh et al., 1985) and in the deaf population (Joiner & Erickson, 1969) found significant correlations between academic self-concept and grade point average. However, until more conclusive studies provide information regarding the status of academic self-concept in deaf students' academic achievement, in addition to academic self-concept, other variables should be considered when placing deaf students in mainstream settings.

2. Deaf students receiving the majority of instructional time with hearing students had significantly higher non-verbal intelligence and reading ability than those students receiving the majority of instructional time with other deaf students. In view of the importance of both nonverbal and reading skills in the mainstream educational setting, prior to integrating deaf students into a hearing class, assessments should be conducted in both of these areas to help predict academic potential.

3. Oral communication skills appear to be an important factor in selecting deaf students for mainstream education. Better oral skills may be associated with a stronger foundation in language, the use of internal speech in reading, and higher reading achievement. However, ability in oral communcation should not be used as a predictor of reading achievement. As previously indicated, deaf students with limited oral communication skills can learn to read. For example, the thirteen year old student in Group I who had a grade 10 reading score used sign language as a primary means of communication.

4. In the present research, neither hearing loss nor gender had a significant influence on the academic self-concept or reading achievement of deaf adolescents. Perhaps these two factors should receive less attention than other factors when considering students for mainstream education .

Further Research

Results of the present study highlight several important considerations for further research:

1. A larger sample of subjects drawn from a wider and more diverse geographic area could be used to test findings obtained in the present study. Use of a larger, randomly selected sample would increase the external validity of the research.

2. Further research could examine current practices used to determine which educational placement would be appropriate for an individual deaf child. Such research might examine (a) who is responsible for selecting the educational placement, (b) what factors in the child are considered, and (c) if the literature provides information regarding the strengths and weaknesses of the two different educational systems. With regards to the first item, parents of deaf students might be interviewed to discover how they select an educational setting for their deaf children.

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APPENDIX A

Self-Concept of Ability--Form D

1. Think of your friends. Do you think you can do school work better, the same, or poorer than your friends?
    a. better
    b. the same
    c. poorer
2. Think of the students in your class. Do you think you can do school work better, the same, or poorer than the students in your class?
    a. better
    b. the same
    c. poorer
3. When you graduate from high school, do you think you will be with the best students, average students, or below average students?
    a. the best
    b. average
    c. below average
4. Do you think you could graduate from college*?
    a. yes
    b. maybe
    c. no

5. If you went to college*, do you think you would be one of the best, average, or poorest students?

    a. the best

    b. average

    c. poorest

6. If you want to be a doctor or a teacher, you need more than 4 years of college*. Do you think you could do that?

    a. yes

    b. maybe

    c. no

7. Forget how your teachers mark your work. How good do you think your own work is?

    a. excellent

    b. average

    c. below average

8. What marks to you think you really can get if you try?

    a. A's and B's

    b. B's and C's

    c. D's and E's

* For this study, the term "college" was changed to "university".

APPENDIX B

SPACHE FORMULA AND FOG FORMULA

Spache Formula

Step 1: Number of words in the sample: 103

Step 2: Number of sentences in the sample: 22

Step 3: Number of "hard words" not on Dale's easy list of words from the sample: 5

Step 4: Using Table ll.1 (Smith, 1980), find the intersection of the number of words and the number of sentences in the sample: .567

Step 5: Using Table ll.1 (Smith, 1980), find the intersection of the number of words and the number of "hard words" in the sample: 1.057

Step 6: Add steps 4 and 5 to determine the reading level of the sample: .567 + 1.057 = 1.624 or 1.6

Smith, L. L. (1980). Rapid computation of the spache revised readability formula. Reading Horizons, 20(3), 193-195.

FOG Formula

Step 1:	Number of words in sample: 103
Step 2:	Number of sentences: 22
Step 3:	Average sentence length (Step 1 / Step 2): 103 / 22 = 4.681
Step 4:	Number of difficult words (3 or more syllables but neither inflected endings nor compound words): 4
Step 5:	Amount of difficult words (Step 4 / Step 1): 4 / 103 = .03883
Step 6:	Add Steps 3 and 5: 4.681 + .03883 = 4.7198
Step 7:	Multiply by .4: 4.7198 X .4 = 1.8879 =1.9

Muir, S. (1978). Clearing the air of fog and smog. Reading Horizons, 18(4), 285-288.

APPENDIX C

Parent's/Guardian's Consent Form

Dear Parents/Guardians:

I am a Masters student in Educational Psychology at the University of Alberta and am conducting a study to explore academic self-concept and reading ability of hearing impaired students.

To complete the study, information will be obtained from cumulative record cards and from reading and writing tasks performed by the students. These tasks will take approximately one hour. I am interested in the performance of groups of students and information on individual performance will be strictly confidential. On completion of the study, group results will be distributed to teachers, parents, and students. This research is being co-supervised by Dr. E. Conn-Blowers and Dr. C. Cumming, Faculty of Education, University of Alberta.

If you will allow your child to participate in the study and will grant me permission to view your child's cumulative record card, please sign and return the forms below.

Sincerely,

Babette Jessen

==========

I grant permission for my child to participate in the research study as outlined above.

Child's Name_____

Parent's Signature_____

I grant permission for Babette Jessen to view and obtain information from my child's cumulative record card on the condition that all information is kept confidential.

Child's Name_____

Parent's Signature_____

APPENDIX D

Student Participation Form

Dear Student:

I am a graduate student at the University of Alberta. I am writing a report about hearing impaired students' reading and how hearing impaired students feel about their school work.

You are invited to participate in my study. You will be asked to answer a few questions about yourself and your school work and to complete some reading and writing exercises. These activities will take about an hour and will be conducted in your school. Your work and answers will be private and will not be shown to anyone or used for school marks.

If you will help me with my report, please sign and return the form below. I look forward to meeting you and working with you.

Sincerely,

Babette Jessen

==========

I would like to participate in your study [ ]

My name (print)_____

Signature_____

APPENDIX E

Subject Data Form

Identification Number_____

Gender_____

School Setting_____

Grade_____

Birthdate_____

Age_____

Hearing Loss (PTA)_____

Prelingual_____ Postlingual_____

Amplification_____

Father:

Education_____

Occupation_____

Hearing Status_____

Mother:

Education_____

Occupation_____

Hearing Status_____

Siblings:

Gender and Ages_____

Hearing Status_____

Tests: Dates of Administration and Scores

CAT--Reading Comprehension

Date_____

Score_____

_____

Raven's Standard Progressive Matrices

Date_____

Score_____

_____

SCA-D

Date_____

Score_____

_____